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ABSTRACT

Career interventions, and the related research and theory on this topic continue to be one of the most productive areas of practice, research, and theory in counseling psychology. Many studies of client characteristics and counseling interventions have examined the relationship between constructs derived from Holland's theory of vocational choice and various types of counseling interventions. The focus of this study was to link what has been learned from the history of career interventions and the application of Holland's theory to the career interventions process, to the use of computer-assisted career guidance systems as a career guidance intervention, with the goal of improving practitioners' decisionmaking regarding the best use of this technology with various types of clients. Subjects (N=102) were individuals who sought assistance at a university-based career center. They consisted of 71 females (69.6%) and 31 males (30.4%) with a mean age of 20.8, primarily white (93.1%) and primarily sophomores (41.2%) and junior (21.6%). A variety of client characteristics were used to examine client reactions to using SIGI PLUS, a computer-assisted career guidance system. Regression analysis revealed that persons with higher Social and Enterprising scores on the Vocational Preference Inventory rated the system lower on its ability to help them acquire self- and occupational knowledge. Characteristics such as gender, differentiation, vocational identity, and career decidedness were not shown to have a significant effect with respect to the use of a computer-based career guidance intervention. The results support consideration of the unique personality characteristics of clients when prescribing computer-based interventions. (LLL)

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Holland's Theory and Effective Use of Computer-Assisted Career Guidance Systems: Technical Report No. 12

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by

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Author Notes

The Computer-Assisted Career Guidance Evaluation Form is available from the authors at: The Curricular-Career Information Service, R-28, 224 Bryan Hall, Florida State University, Tallahassee, Florida, 32306-1035.

Abstract

A variety of client characteristics, drawn primarily from John Holland's theory and constructs, were used to examine client reactions to using a computer-assisted career guidance system. The subjects were 206 individuals who sought assistance at a university-based career center. A regression analysis revealed that persons with higher Social and Enterprising scores rated the system lower on its ability to help them acquire self and occupational knowledge.

Career interventions, and the related research and theory on this topic, continue to be one of the most productive areas of practice, research and theory in counseling psychology (Holland, Magoon, & Spokane, 1981). The history of counseling documents an ongoing preoccupation on the part of researchers, theorists, and practitioners with what type of intervention is effective with what type of client (Fretz, 1981; Holland, Magoon, & Spokane, 1981; Hosford, Burnett, & Mills, 1984; Rounds & Tinsley, 1984; Rounds & Tracey, 1990). In their review of career interventions, Pickering and Vacc (1984) found support for Fretz's (1981) assertion that continued research is needed on various types of interventions and how these interventions interact with client attributes. Similarly, Hosford, Burnett, and Mills (1984) noted that a variety of client attributes and personality characteristics can affect treatment outcomes and need to be taken into consideration when developing prescriptive counseling interventions.

Many studies of client characteristics and counseling interventions have examined the relationship between constructs derived from John Holland's theory of vocational choice (Holland, 1985a) and various types of counseling interventions (Abler & Sedlacek, 1987; Cox & Thoreson, 1977; Farber, 1986; Flanagan, 1983; Kivlighan, Hageseth, Tipton, & McGovern, 1981; Kivlighan & Shapiro, 1987; MacDonald, 1984; Mahalik & Kivlighan, 1988; York & Tinsley, 1986). Several authors (Farber, 1986; Mahalik & Kivlighan, 1988; Rosenberg & Smith, 1985; York & Tinsley, 1986) have made suggestions concerning the types of interventions that

are likely to be preferred by persons characterized as Social and Enterprising versus persons characterized as Realistic and Investigative, with the former preferring more verbal interventions and the latter being more willing to interact with objects or machines. There is an ongoing need for research to demonstrate the efficacy of these suggestions with respect to prescribing career interventions. In addition to personality characteristics, some writers have suggested additional client characteristics that may be important to consider when prescribing interventions, including career decidedness (Slaney, 1988; Slaney & Dickson, 1985; Slaney & Lewis, 1986), vocational identity level (Fretz & Leong, 1982), differentiation (Holland, 1987), and gender (Brenner & Gazda-Grace, 1978; Lunneborg, 1978).

The recent history of career interventions has seen unprecedented growth in the use of computer-assisted career guidance systems (CACGS) as an intervention for clients with a variety of presenting problems (Harris-Bowlsbey, 1984; Rayman, 1990; Sampson, 1984a, 1984b). Sampson (1983) describes CACGS as "one of the most widely used applications of computer technology in the counseling field" (p. 68). Given the widespread use of this technology in a variety of counseling settings, it is important for researchers and practitioners to learn as much as possible about how this technology can be applied effectively (Harris-Bowlsbey, 1983; Katz & Shatkin, 1987; Taylor, 1988). Holland, Magoon, and Spokane (1981) noted that computer systems represent a highly structured treatment, and that under certain conditions structured treatments are as helpful as professional

counselors. What remains unclear, however, is exactly what these "conditions" are? More research is needed on questions relating to the interaction between client characteristics and the use of CACGS as a intervention (Sampson, 1984a; Sampson, Reardon, & Lenz, 1991). Sampson, Peterson, and Reardon (1989) called for more explicit theory-based approaches to guide counselors' use of CACGS in the career intervention process.

In the career counseling field, there is little evidence that counselors give consideration to many of the client variables mentioned above, prior to prescribing a computer-based intervention. However, it is important that counselors not lose sight of individual client needs and characteristics in recommending a computer-based intervention. In the rush to take advantage of computer applications, practitioners may be making the assumption that any and all clients, regardless of presenting problem and characteristics, could benefit from interaction with a computer. Career counselors, more so than other human service professionals, may have become veteran users of computer technology, given its widespread use in career guidance settings. However, as Shore (1987) pointed out, when users become veterans, they take for "granted all sorts of skills, intuition, and information" (p. 15) related to computer use that clients or others users may not possess. Furthermore, as concerns with accountability mount in educational settings, and the pressure to justify expenditures for computer systems increases, counselors may feel a need to adopt a "headcount" approach to system use, documenting numbers, rather than carefully considering whether

this form of intervention is likely to produce the desired results. Although some writers (Sampson, 1984a; 1986; Sampson, Peterson, & Reardon, 1989; Sampson, Reardon, & Lenz, 1991) have documented the need for attention to client variables to insure maximum effectiveness of computer applications in the career guidance process, the popularity of this technology and its rapid spread has outpaced research evidence that might serve as a guide for practitioners seeking more effective use of these systems (Rayman, 1990).

The primary focus of this study was to link what has been learned from the history of career interventions and the application of Holland's theory to the career intervention process, to the use of CACGS as a career guidance intervention, with the goal of improving practitioners' decision-making regarding the best use of this technology with various types of clients. The present investigation examined the following question: Does knowledge of clients' gender, personality, level of vocational identity and career decidedness, and degree of interest definition (differentiation) improve predictions regarding how clients will react to using a computer-based career intervention? The choice of these independent variables was guided by several considerations. First, previous studies have documented the usefulness of these constructs in improving practitioners' and researchers' understanding of outcomes and interactions associated with a variety of career interventions, including computer-based guidance systems. Second, the instruments used to collect data on these client characteristics

are low cost, easily and quickly completed, and have a history of previous use in a variety of research studies and career guidance settings. Rounds and Tinsley (1984) pointed out that the value of a classification system designed to aid in diagnosing and treating career problems is determined by the degree to which practitioners use it and researchers study it.

Method

Subjects

Subjects (n=206) for this study were persons seeking assistance for career concerns at a comprehensive university-based career center. The use of actual clients in need of career assistance was in keeping with a frequently cited suggestion for improving research in this area (Kivlighan & Shapiro, 1987; Oliver & Spokane, 1988). One hundred and four subjects did not keep their initial computer appointment or failed to return to complete to follow-up forms. The group completing the study (n=102) consisted of 71 females (69.6%) and 31 males (30.4%) with a mean age of 20.8. Subjects ranged in age from 17 to 46. The majority of the participants listed their ethnic group as white (93.1%). The sample was primarily composed of sophomores (41.2%) and juniors (21.6%). The majority of participants listed majors from the College of Business (15.7%), Arts and Sciences (18.7%), or indicated they were "undecided" (38.2%). Fifty-seven (57%) percent of the participants indicated that their most important reason for seeking career assistance at this time was related to concerns in the area of "career-educational planning/decision-making."

Treatment

The computer-assisted guidance system, SIGI PLUS (Educational Testing Service, 1988a), was used as the treatment intervention in this study. SIGI PLUS includes nine sections that enable users to: (1) determine sections of the system appropriate to their needs; (2) examine their values, interest fields, and activities they enjoy and do well in; (3) choose features they want and don't want in their work; (4) gather detailed information on occupations; (5) see the skills needed in various occupations and rate themselves on these skills; (6) examine information on the preparation needed for various occupations and determine the likelihood that they would be able to complete the necessary preparation; (7) consider practical issues associated with pursuing a particular career; (8) compare and contrast occupational choices and determine the best alternatives; and (9) develop short-term strategies for achieving their career goals.

Measures

The User Information Form, which included the Occupational Alternatives Question (OAQ), was used to collect basic demographic information on each subject, including gender, age, grade level, major, need for assistance, and previous experience with various career services. The OAQ (Zener & Schnuelle, 1972; modified by Slaney, 1978; 1980) served as a measure of subjects' career decidedness. The OAQ is comprised of two parts: (a) list all the occupations you are considering right now, and (b) which occupation is your first choice? (if undecided--write undecided).

The OAQ is scored as follows: 1 = a first choice is listed with no alternatives, 2 = a first choice is listed with alternatives, 3 = no first choice is listed, just alternatives, and 4 = neither is listed. Using this scoring procedure, the concurrent validity of the OAQ with other measures of career indecision has been demonstrated in several studies (Slaney, 1980, 1983; Slaney, Stafford, & Russell, 1981). Test-retest reliability was reported at .93 (Redmond, 1973) and found to be stable over a six week period (Slaney, 1978).

Subjects were given the Vocational Preference Inventory (VPI) (Holland, 1985b) to determine their scores for the six Holland types. The VPI consists of 160 occupational titles and individuals are asked to indicate whether they like or dislike the titles listed. The inventory produces scores for the six Holland types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional, as well as scores for five other scales covering a variety of personal characteristics. Of particular interest in this study were subjects' scores on the Realistic, Investigative, Social, and Enterprising scales. These four scales were selected for the analysis in order to provide the greatest contrast between subjects' who are likely to enjoy interacting with a computer versus those who are likely to prefer human interaction. The manual for the VPI (Holland, 1985b) reports internal consistency (KR 20) data for men across the six types ranging from .85 to .91, and for women ranging from .86 to .91. Evidence of the construct and criterion-related validity of the VPI is also provided by Holland (1985b).

The My Vocational Situation (MVS) (Holland, Daiger, & Power, 1980) was used to assess subjects' vocational identity level. The version used in this study omitted the sections for subjects' gender, age, educational level, and occupational aspirations to avoid repetition with items on the User Information Form. The MVS consists of three scales: Vocational Identity (VI), Occupational Information (OI), and Barriers (BA). Responses on the Vocational Identity scale provide an indication of the degree to which individuals possess a clear and stable picture of their goals, interests, personality, and talents. The manual (Holland, Daiger, & Power, 1980) for the MVS reports the following reliability estimates: .89, .79, and .45 for the VI, OI, & B scales respectively. Leong and Morris (1989) provide evidence for the discriminant and convergent validity of the VI scale.

Differentiation was operationalized using subjects' VPI scores and the formula suggested by Holland (1985a). The Holland index for differentiation is a numerical value that equals the absolute difference between a person's highest and lowest VPI scores (Holland, 1985a). Although studies (Gottfredson & Holland, 1990; Iachan, 1984; Monahan, 1987) have reported on the use of alternative methods for calculating differentiation, none have provided clear support for abandoning the original index.

This study made use of an instrument developed specifically to provide an evaluation standard for a variety of CACG systems, regardless of their unique characteristics. A weakness of previous research in this area has been the use of system evaluation forms that lacked validity and reliability (Peterson,

Ryan-Jones, Sampson, & Reardon, 1988; Rayman, 1990). The Computer-Assisted Career Guidance Evaluation Form (Peterson, Ryan-Jones, Sampson, & Reardon, 1988) was developed to assess the extent to which a particular CACG system helped individuals in the following ways: (1) clarify values, interests, and abilities; (2) acquire an understanding of the world of work; (3) identify and/or formulate potentially satisfying occupations congruent with values, interests and abilities; (4) evaluate viable career options through an analysis of their advantages and limitations; and (5) once an occupation is chosen, develop a systematic plan of action to implement the choice. The current instrument, consisting of 24 items, was derived from an earlier instrument consisting of 64 items. Through principle factoring with varimax rotation, six orthogonal factors with eigen values greater than 1.0 were identified. The factors were labeled in descending order of eigen values: I, Attractiveness of CACG Systems; II, Needs for Occupational Knowledge; III, Credibility of Alternatives; IV, Knowledge of Occupational Rewards and Demands; V, Satisfaction of Alternatives; and VI, Clarifying Self Knowledge. The items comprising the above six factors were combined to form three higher order composite scales: Analysis, Synthesis, and Computer Effect. The Analysis scale consisted of 10 items comprising Factors II, IV and VI and measured how well the CACG system helps individuals acquire self-knowledge and occupational knowledge. The Synthesis Scale was composed of 5 items loading on Factors III and V. This scale assessed the degree to which a CACG system helped users identify potential

career alternatives. The third scale, Computer Effect, was composed of only a single factor (I) with 9 items which measured the degree to which individuals find interacting with the computer rewarding. Peterson, Ryan-Jones, Sampson, and Reardon (1988) reported intercorrelations among the three composite scales ranging from .39 to .60, with respective alpha reliabilities of .83 (Analysis), .77 (Synthesis), and .87 (Computer Effect). The CACG Evaluation Form uses a 5-point Likert scale consisting of the following responses: 1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree. Mean scores for each scale are derived by summing responses for items comprising the particular scale and dividing that sum by the total number of items for that scale.

Procedure

Subjects who sought assistance at the university career center were asked to participate in the study during their initial visit. Those who agreed to participate were asked by Career Advisors (CAs) working in the center to complete the User Information Form/OAQ, MVS, and VPI. CAs completed a contract for each subject outlining the three steps in the research process: (1) complete pre-forms; (2) use SIGI PLUS; (3) complete post-forms; and any additional activities that seemed appropriate to the client's situation.

Subjects were given an overview of the system components, provided with a copy of the SIGI PLUS User's Guide (Educational Testing Service, 1988b), and were given general guidelines on the most effective means for using the system based on suggestions

provided in the SIGI PLUS Counselor's Manual (Educational Testing Service, 1985). They were encouraged to make use of any sections of the system that seemed relevant to their needs. There were no restrictions placed on the amount of time they were allowed to use SIGI PLUS. Subjects were asked to refrain from using other CACGS available in the career center until after they completed post-treatment measures. Upon completing their use of the system, subjects were scheduled for a follow-up appointment, during which time they completed the CACG Evaluation Form (which included a second OAQ), a second MVS, were debriefed, and referred to additional forms of assistance as needed. For a more detailed discussion of these procedures see Lenz (1990).

Data associated with the research question of interest were analyzed using multiple regression applications available in SPSSX (SPSS Inc., 1986). Alpha was set at .05 for all analyses.

Results

To determine if there were differences between subjects who completed the study and those who did not, t-tests and chi-square analyses were conducted on the variables age, vocational identity (pre), career decidedness (OAQ pre), VPI Realistic (R), Investigative (I), Enterprising (E), and Social (S) scores, differentiation (VPI), gender, ethnic group, grade level, and need for assistance. The results revealed no significant differences between these two groups.

The independent variables used in the regression analysis included gender and subjects' pre-scores on the MVS Vocational Identity scale, the Occupational Alternatives Question (OAQ),

Realistic, Investigative, Enterprising and Social scores (VPI), and differentiation score (VPI). All independent variables used in the regression equations were entered simultaneously and separate analyses were conducted for the Analysis, Synthesis, and Computer Effect subscales of the Computer-Assisted Career Guidance (CACG) Evaluation Form. Entering the independent variables simultaneously is considered an appropriate regression procedure when there is no clear rationale for entering a particular independent variable prior to any other independent variable (Wampold & Freund, 1987). The results of these analyses are discussed in the following paragraphs.

The regression procedure for the Analysis subscale produced an R^2 of .15 and an adjusted R^2 of .079. The regression equation was significant $F(8,93)=2.072$, $p \leq .05$. In these results, scores on the Social ($t=-1.940$, $p \leq .05$) and Enterprising ($t=-2.109$, $p \leq .05$) scales were significant predictors of subjects' ratings of the extent to which SIGI PLUS helped them acquire self and occupational knowledge, with the negative sign indicating that persons with high scores on the Social and Enterprising scales tended to rate the computer lower on the Analysis scale.

Insert Table 1 about here

The regression equation for Synthesis was not statistically significant, $F(8,93)=.417$, with an R^2 of .04 and an adjusted R^2 of -.049. None of the independent variables was a significant

predictor of the degree to which the system helped users identify career alternatives (Synthesis).

Similar results were found with the regression equation for the Computer Effect scale, $F(8,93)=.523$, with an R^2 of .04 and an adjusted R^2 of -.040. None of the independent variables was a significant predictor of the degree to which individuals found interacting with the computer rewarding (Computer Effect).

Discussion

The central focus of this study was the effect of selected client characteristics on clients' evaluations of a computer-based career intervention. The sample attrition reduced the power in the regression analysis and the potential for finding significant results.

The multiple regression procedure used to analyze the effect of the independent variables on the dependent measure found that only subjects' scores on the VPI Social and Enterprising scales proved significant. As subjects' scores on the Social and Enterprising scales increased, their ratings of the system's contribution to their self and occupational knowledge decreased. Rosenberg and Smith (1985) suggested that both Social and Enterprising types need career counseling that is very verbal. If computer-based interventions are used with clients who have high Social or Enterprising scores, practitioners may want to consider using a post-system counseling session to allow these types to talk about their experience and the extent to which their career concerns were addressed by this type of

intervention. Chartrand and Robbins (1990) noted the increasing importance of selecting career interventions targeted to the different clients. However, in this study, characteristics such as gender, differentiation, vocational identity, and career decidedness were not shown to have a significant effect with respect to the use of a computer-based career guidance intervention.

In summary, these results add to the findings of previous studies that examined personality characteristics associated with Holland types in relation to counseling interventions. The results provide some support for the suggestion that computer-based interventions may be enhanced by insuring that they are not administered as a global, uniform treatment, but rather are prescribed in a way that takes into consideration the unique personality characteristics of clients.

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Table 1

Multiple Regression Results for Computer-Assisted Career Guidance Evaluation Form: **Analysis** Scale

Independent Variables	B	beta	t	p
Gender 0=Female 1=Male	-.1690	-.1769	-1.638	.10
OAQ (pre)	-.0068	-.0094	-.094	.92
Voc. Identity (pre)	-.0260	-.1883	-1.777	.08
Realistic	-.0109	-.0381	-.326	.74
Investigative	-.0293	-.1705	-1.329	.19
Social	-.0301	-.2507	-1.940	.05*
Enterprising	-.0374	-.2842	-2.109	.04*
Differentiation	.0332	.2232	1.314	.19

R^2	.154
Adjusted R^2	.080
F Value	2.072